PAF episodes were divided into group A ("sudden onset") and group B ("PAC activity before onset"). The mean PAF episode durations of both groups were then compared. Sudden PAF onset was defined as missing PAC activity in the last 10 beats before PAF initiation.
Results: Group A comprised 145 (54.9 %) PAF episodes. A significantly longer mean PAF episode duration was found in group A as compared to group B (6.06 ± 42.36 vs. 1.85 ± 6.72 hours, p < 0.01).
Conclusion: 1. In our study group more than half of the PAF episodes were initiated without any PAC activity in the last 10 beats before onset. 2. Arrhythmia episodes with sudden PAF onset were associated with a prolonged PAF episode duration as compared to PAF episodes with prevalent pre-onset PAC activity. 3. The combination of missing PAC activity and long PAF episode duration may reflect a higher atrial "substrate factor" facilitating PAF induction and maintenance. The efficacy of preventive pacing algorithms might therefore be limited in patients with predominantly sudden onset of PAF.

POSTER SESSION

1052

Pulmonary Vein Isolation to Treat Atrial Fibrillation I

Sunday, March 07, 2004, 3:00 p.m.-5:00 p.m.
Morial Convention Center, Hall G
Presentation Hour: 4:00 p.m.-5:00 p.m.

1052-207 Left Atrial Flutter Post Pulmonary Vein Isolation: Draw a Line or Reisolation of the Recovered Pulmonary Vein Ostium?

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Background: The incidence of left atrial flutter (LAFL) post pulmonary vein isolation (PVI) for treatment of atrial fibrillation (AF) has been reported to vary between 2 and 8%. We report our experience with this arrhythmia.
Methods: 613 patients presented for PVI for treatment of symptomatic AF. All PVs and when possible, the superior vena cava (SCV), were ablated in all patients. Patients were followed post-ablation for incidence of recurrent arrhythmias and brought back to the electrophysiology lab for re-evaluation.
Results: After a mean follow up of 491±290 days, 15 patients developed recurrence of LAFL. Out of 24 flutter circuits identified in these patients, 5 could not be mapped. The remaining 19 circuits were defined using the CARTO 3D mapping system. Of these 19 circuits, 10 circuits were defined to be between the mitral annulus and a posterior wall scar, 5 were between two posterior wall scars, 3 were around the left PV, and 1 rotated around the septum primum. In all 15 patients, recovery of 2 ± 2 PV ostial conduction was detected. Re-isolation of the recovered sites was subsequently performed. Additionally, a flutter line was needed to terminate a mitral annulus circuit and a circuit between 2 posterior wall scars. After a mean follow-up of 340±90 days, only one patient experienced recurrence of LAFL.
Conclusion: In patients with recurrent LAFL post PVI, re-isolation of recovered PV ostia appears to be sufficient in curing the majority of patients presenting with LAFL following PVI treatment of AF.

1052-208 Left Atrial Flutter Following Circumferential Pulmonary Vein Ablation for the Treatment of Atrial Fibrillation

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Background: Circumferential pulmonary vein ablation (CPVA) has emerged as a curative therapy for atrial fibrillation (AF). Linear ablation lesions deployed in the left atrium (LA) may serve as substrates supporting left atrial flutter (LAFL). This study sought to investigate the incidence and substrates of LAFL following CPVA.
Methods: Fifty-one consecutive pts (57 +/- 9 yrs, 17 F) with paroxysmal (n = 45) or persistent (n = 6) AF were included. CPVA was performed by delivering radiofrequency (RF) lesions around the ostia of pulmonary veins (PV) plus a linear lesion bridging the ostium of left inferior PV to the mitrial annulus (MA) under 3D electroanatomic (Carto) guidance. Periodic 7-day Holter monitoring was conducted after ablation to screen the occurrence of LAFL and recurrence of AF. Repeated electroanatomic mapping and RF ablation procedure was advised if sustained LAFL was documented.
Results: Eleven pts (22%) had documented sustained LAFL during the index procedure or during follow up. Of those, electroanatomic and entrainment mapping were performed in 5 pts to delineate reentry circuits. Among 14 LAFLs (2.8 per pt, cycle length 190 to 305ms) encountered in the procedures, electroanatomic mapping was completed during 9 LAFLs. Carto activation map showed: 3 LAFLs rotated around a functional line of block on the LA posterior wall created by prior linear lesion; 2 LAFLs were dual loop reentry rotating around 2 adjacent functional lines of block on LA posterior wall after linear ablations, respectively, and used one gap in between as their common pathway; 2 LAFLs rotating around right PVs were constrained by MA and a line of block created by prior linear ablation; 1 LAFL rotated around a line of block through 2 gaps at the prior linear lesion encircling the left upper PV; 1 LAFL was a peri-MA reentry. After a median of 8 (range 1-16) months follow-up, 5/11 (46%) pts had AF recurrence, 4/11(36%) were in sinus rhythm, 2/11 (18%) in persistent LAFL.
Conclusions: LAFL occurs in 22% of pts after CPVA. Discrete functional or fixed lines of block with single or multiple gaps, created by prior linear ablation lesions, serve as the most common substrates supporting LAFLs. LAFL may contribute to the recurrence of AF after CPVA.

1052-219 Early Changes in Pulmonary Vein Activation Predict Effectiveness During Pulmonary Vein Isolation Using a Novel Curvilinear Cryoablation Catheter

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Background
Pulmonary vein (PV) isolation by cryoablation can be time-consuming, predominantly due to the long duration of each cryo-application but has safety advantages in avoiding PV stenosis and local thrombus formation. We hypothesized that the likely effectiveness of each cryo-application can be predicted by early changes in PV activation during cryo-delivery. This may consequently shorten the procedural cryo-application time that was needed for isolation.
Methods
Using a novel 7F steerable curvilinear tipped cryoablation catheter (Artic Circler^{TM}), we targeted 32 PVs (diameter 19±5mm) in 17pts (12M, age 52±12yrs) with drug refractory paroxysmal atrial fibrillation. The cryoablation catheter was placed at the ostium of each targeted vein, proximal to a circumferential mapping catheter (Lasso ^{TM}). Cryoablative lesions were created at ≤-80ºC for ≤4min. PV isolation was defined as either the elimination of PV electrograms or their dissociation from left atrial (LA) electrograms. An effective application was defined as one causing a significant change in PV activation.
Results
Twenty-five (78%) PVs were successfully isolated, 16 using the circular cryoablation catheter alone, and 9 after additional cryoablation with a 6mm-tipped catheter. Of 371 (12±8 per PV) applications delivered using the circular catheter, 107 (29%) were terminated within 60s due to suboptimal catheter position. The remaining 265 applications (71%) were continued for >60s (mean 200±64s), of which 92 (35%) were effective. To detect a possible cumulative effect, applications for each PV were divided into tertiles. Effective applications were evenly distributed across these (32, 30 and 30 for the 1st, 2nd, and last tertile, respectively), so that the index of effectiveness was independent of total energy delivered. All but one effective application caused a ≥10% prolongation of LA-PV conduction time or a significant change in PV morphology within the first 40 (17±13) sec of the delivery.
Conclusion
Effective application using a circular cryoablation catheter can be predicted by early changes in PV activation. This may avoid prolonged applications at ineffective sites and shorten procedure time.

1052-220 Safety and Efficacy of Catheter Ablation of Atrial Fibrillation Using an Irrigated-Tip Ablation Catheter

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Introduction: The purpose of the study is to report the safety and efficacy of catheter ablation of atrial fibrillation (AF) using an irrigated- tip ablation catheter.
ethods: Seventy-five consecutive patients (51 men; age 54 ± 13 years) with symptomatic drug refractory paroxysmal (42 patients), persistent (21 patients) or permanent (12 patients) AF underwent catheter ablation of AF using an irrigated-tip ablation catheter and a standard ablation strategy, which involved electrical isolation of all pulmomary veins (PVs) and creation of a cavotricuspid linear lesion.
Results: At 10.5+7.5 months of follow-up following a single (n= 75) or redo ablation procedure (n=11), 39 of the 75 patients were free of AF (52%), 10 were improved (13%), and 26 had experienced no benefit from the ablation procedure (35%). The most significant complications were two episodes of pericardial tamponade, mitral valve injury in one patient, two strokes, and complete but asymptomatic PV stenosis in one patient. A Cox proportional hazards multivariate regression analysis identified the presence of persistent AF, permanent AF and age more than 50 years prior to the ablation were the only independent predictors of AF recurrence after the first PV isolation procedure.
Conclusions: Catheter ablation of AF using a strategy involving isolation of all PVs, the creation of a linear lesion in the cavotricuspid isthmus, using cooled RF energy is associated with moderate efficacy and an important risk of complications. The best results of this procedure are achieved in the subset of patients who are less than 50 years of age and have only paroxysmal AF. It is likely that more aggressive ablation strategy that involve more extensive and circumferential ablation lesions will be needed in patients over 50 years with persistent or permanenet AF to achieve higher success rate.

1052-221 Accurate Identification of Pulmonary Vein Ostia With Real-Time Impedance Measurements

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Background: During radiofrequency ablation to encircle or isolate the pulmonary veins (PV), accurate identification of the ostia is critical to prevent PV stenosis. Impedance may be higher within a PV than at its ostium. The purpose of this study was to determine whether monitoring of real-time impedance facilitates identification of the PV ostia.
Methods and Results: In 26 consecutive patients (mean age= 54 ± 11 years) who underwent a left atrial ablation procedure, the 3-D geometry of the left atrium, the PVs, and their ostia were reconstructed using an electroanatomical mapping system. The PV ostia were identified based on venography, changes in electrogram morphology, and